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ORIGINAL ARTICLES.

REPORT ON DISEASES OF DOMESTIC ANIMALS.

[By JAMES LAW, Professor of Veterinary Medicine in Cornell University.]

Dr. J. L. CABELL:

SIR: In compliance with your request, I respectfully submit the accompanying statement as to how far in my opinion the functions of the National Board of Health must embrace a superintendence of the sanitary condition of the domestic animals. I have considered such animal diseases as determine specific and communicable disorders in man, and have sought to point out in what cases the gravity of the affection would demand the interference of a health board. A large number are mentioned over which a national board of health must exercise a careful supervision if they would fulfil their trust; and to enable them to accomplish this, Congress must give them power to add to their number men who have made a special study of animal diseases, and who are prepared to cope with them successfully. I have further sought to show how essential it is that a board so constituted should be invested with executive power and not left as a mere advisory body, which must lose in intelligence, efficiency, and

esteem in proportion as it is debarred from the practical work of overcoming insanitary conditions and of instituting experiments to determine the best methods of sanitation.

Finally, I have entered on the question of those affections of the domestic animals which are not communicable to man, but are transmissible from animal to animal so as to constitute veritable plagues and to undermine our agricultural prosperity. As agricultural success is the true basis of all national prosperity, the suppression and extinction of these animal plagues is a work only secondary in importance to the arrest of epidemics, as national wealth is only second to moral advancement.

Here arises the question whether a board of health already constituted to deal with a certain number of animal plagues is not the most economical and efficient medium through which to deal with all, and whether the whole subject of animal sanitation should not therefore be placed in the same hands. In seeking to take an impartial view of this matter, I have taken into account the financial interests involved and the necessity for a representation of these in any organization appointed to deal with the subject. I have also considered the great expenditure necessary to a prompt extinction of the exotic animal plagues, and the need of an executive head who can act promptly in every emergency and without the fatal delays that would attend on calling meetings of a health board whose members reside at long distances from each other. Also the vast importance of a speedy extinction of exotic plagues before they can gain a footing on the plains and boundless unfenced pasturages of the West and South, from which it would be hopeless to attempt their extermination. And, finally, the imperative need of prompt and effective work in order that the country may be made aware of the advantages of such an executive, and that there may be no excuse for a temporary—perhaps a final—abolition of the organization before they have had an opportunity to exterminate a single plague, and thereby to demonstrate their value to the nation.

In view of these and other considerations an opinion is respectfully submitted which is, at least, the result of no hurried conclusion, but of careful deliberation.

LIST OF COMMUNICABLE ANIMAL PLAGUES.

As the magnitude and gravity of this subject is but little appreciated, it will be best introduced by stating, in tabular form, the diseases of the domestic animals that are known to be communicable between animals only. Afterward, the question will come up as to which of these diseases will demand the supervision of a health board, and under what circumstances.

A.—*Contagia common to man and animals.*

1. Glanders and farcy in horses, &c.
2. Canine madness, rabies in dogs, cats, &c.
3. Malignant anthrax in all domestic animals.
4. Tuberculosis in all animals.
5. Asiatic (malignant) cholera in all animals.
6. Milk-sickness in cows and other animals.
7. Small-pox in chickens, pigeons, &c.
8. Eczematous (aphthous) fever in bisulcates, &c.
9. Typhoid fever (?) in sucking animals.
10. Diphtheria in animals.

B.—*Parasites common to man and animals.*

1. Echinococcus in animals; Tænia echinococcus in dogs.
2. Cysticercus cellulosa in swine; Tænia solium in man.
3. C. medio-cannellata in calves; T. medio-cannellata in man.
4. C. tenuicollis in man, sheep, &c.; T. marginata in dog.
5. Tænia elliptica in man and cat.
6. Bothriocephalus latus in man, dog, &c.
7. B. cordatus in man, dog, &c.
8. Trichina spiralis in swine, &c.
9. Tricocephalus dispar in man and pig.
10. Strongylos gigas in man, horse, ox and dog.
11. Ascaris mystax in cat and human being.
12. Fasciola hepatica in man, herbivora, and omnivora.
13. Distomum lanceolatum in man, herbivora, and omnivora.
14. Pentastoma tænioides in man, dog, sheep, &c.
15. Sarcopsis mutans in chickens and man.

16. *Demodex folliculorum* in dog, sheep and man.
17. *Æstrus bovis* and other cuticolla in cattle and man.
18. *Gregarina* in man and animals.
19. *Tricophyton tonsurans* in man and animals. (*Tinea tonsurans*.)
20. *Achorion schönleini* in man and animals. (*Tinea favosa*.)
21. *Microsporon adonini* in man and animals. (*Tinea decalvans*.)
22. *Oidium albicans* in man and animals. (Thrush. *m. uguet*.)

C.—*Contagia communicable from one animal to another.*

1. Texas fever in cattle.
2. Swine plague. Intestinal fever of swine. Hog cholera.
3. Bovine lung plague. Contagious pleuro-pneumonia in cattle.
4. Rinderpest in cattle and other ruminants.
5. Sheep-pox. *Variola ovina*.
6. Swine-pox. *V. suilla*.
7. Cow-pox. Horse-pox.
8. Venereal disease of stallions. Dourine.
9. Foot-rot in sheep.
10. Strangles in horses.
11. Influenza in animals.
12. Infectious mammitis in cows.
13. Parturition fever in ewes.
14. Quebra bunda in horses.
15. Horse sickness of South Africa.

D.—*Parasites causing enzootics in animals.*

1. Scabies acariasis:

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| In sheep | { | Follicular scabies. <i>Demodex folliculorum</i> . | |
| | | Scab. { <i>Dermatocoptis ovis</i> . | |
| | | { <i>Dermatophagus ovis</i> . | |
| | { | Black nose. <i>Sarcoptis ovis</i> . (<i>Leptus Americani</i> ?) | |
| In horse | { | Mange. { <i>Sarcoptis equi</i> . | |
| | | { <i>Dermatocoptis equi</i> . | |
| | | { | Poultry mange. <i>Dermanyssus avium</i> , &c. |
| | | { | Foot mange. <i>Dermatophagus equi</i> . |

- { Mange. *Dermatocoptis bovis*.
 In ox { Foot mange. *Dermatophagus bovis*.
 { Poultry mange. *Dermanyssus avium*, &c.
 In pigs and dogs, mange. *Sarcoptis suis* (Squamiferous.)
 In dog { Mange. *Sarcoptis squamiferous* (Suis.)
 { Follicular mange. *Demodex folliculorum*.
 In cat and rabbit, mange. *Sarcoptis nivar*.
 In chicken, scabies { *Sarcoptis mutans*.
 { *Dermanyssus avium*.
2. Lung worms:
- { *Strongylus filaria*.
 In sheep, goat, and camel { *Strongylus filaria*, *varietas longus*.
 { *Strongylus Africana*.
 In horse and ox, *Strongylus micrurus*.
 In swine, *Strongylus elongatus*.
 In birds, gapes. *Sclerostomum syngamus*.
3. *Sclerostomum hypostomum* in sheep.
 4. *Strongylus filicollis* in sheep.
 5. *Strongylus contortus* in sheep and cattle.
 6. *Sclerostomum equinum* in horse.
 7. *S. tetracanthum* in horse.
 8. *S. suis* in swine.
 9. *Tricocephalus affinis* in cattle and sheep.
 10. *Stephanurus dentata* in swine.
 11. *Echinorynchus gigas* in swine, cockroach, ladybug, &c.
 12. *Ascaris suilla* in swine.
 13. *Tænia expansa* in sheep and cattle.
 14. *Cœnurus cerebralis* in sheep, cattle, dogs, &c.
 15. *Cæstrus ovis*, grub in the head, in sheep.

In presenting this formidable list of diseases it must not be supposed that we advocate an immediate resort to suppression of the whole. A very few only will demand prompt and active suppression. For others, even of the most dangerous character, there is only wanted a guardianship over trade, to prevent the importation of disease or its extension into regions where it would

be seriously detrimental. While for most places it will be at long intervals only and in special conditions that the resulting disease will arise to the dignity of an epizootic or epidemic and demand executive interference, yet there are few maladies mentioned above that may not and do not in particular circumstances attain to such dimensions, and a national board of health, charged with the supervision of the sanitary condition of animals as well as men, must be prepared to meet and successfully deal with any one of the above affections to which the human being is subject. Similarly, must an organization, formed to deal with the plagues peculiar to animals, be prepared to deal with any one of those affections when it attains to dangerous proportions.

GLANDERS AND FARCY.

This affection, which so remorselessly ravaged the cavalry regiments and mule trains during the recent American war, was, at the return of peace, scattered widely over the continent. In country districts we continually see it cropping out, and whole studs falling victims to its ravages, while in city car-stables hundreds are not unfrequently slaughtered to arrest the progress of the scourge.

The subjects of the slight and chronic attacks are frequently taken to a distance and sold as sound animals to unsuspecting purchasers, whose health and lives are thus too often sacrificed to the cupidity of an unscrupulous vender; for this terrible malady is as painful, loathsome, and fatal to the human system as to the equine, and every veterinarian of extensive practice can adduce instances in which men have perished miserably from equine infection.

Were it only for the losses inflicted by this scourge, it would demand the prompt destruction and safe disposal of every infected animal.

At the beginning of the present century, horses suffering from chronic glanders were habitually kept and worked in Great Britain, and the losses throughout the island were enormous. Now, where it is illegal to keep a glandered horse, these have been reduced to a very limited number. In the English army, where the presentation of symptoms equivocating glanders entails the prompt

slaughter of the subject, this disease has been definitely eradicated, and a former loss of ten per cent. per annum has been entirely obviated. When we add to this the moral and economic considerations of the preservation of human health and life, the demand for the instant destruction of animals afflicted with this disease becomes imperative. A statute looking to this end is demanded in all States in which it has not already been enacted, and it becomes the duty of the National Board of Health not only to urge the passage of such a protective law, but to see that it is properly administered. That such a supervision is necessary may be inferred from the facts: 1st. That many of the most dangerous forms of glanders show deposits only in the lungs, testicles, or other distant and deep-seated organs, and these would escape the detection of an ordinary observer, or, indeed, of any one excepting a thorough and accomplished veterinarian, and the subjects of such deposits would be preserved for months or years to spread the disease; 2d. That to extirpate the disease when it has broken out in a stud or locality, it is not enough to dispose of the infected beasts and to thoroughly cleanse and disinfect the premises and movable objects, but this must be followed when requisite by an improvement of the hygienic conditions of the stud, and especially in the matters of ventilation, work, and alimentation. In the case of a disease like glanders, so fatal to both man and horse, the infected horse should be slaughtered as would a venomous reptile, without any consideration of indemnity. The laws under which the destruction is effected should, if possible, be State and municipal, so as to make their administration the especial duty of the local magistrates, but it should be made incumbent on all good citizens to notify such authorities in suspicious cases, and in case of uncertainty as to the true nature of the disease or indisposition to administer the law, the National Board of Health should be the court of appeal empowered to institute an examination and to see that the law is enforced.

CANINE MADNESS, RABIES, HYDROPHOBIA.

In canine madness we confront a disease which even more than glanders demands restrictive measures. The glandered horse is

dangerous mainly to those who voluntarily approach him, and he shows no mischievous propensity to inoculate other animals or man with his dreadful infection. But the rabid dog seems as if the impersonation of evil. Himself suffering from one of the most excruciating and hopeless of diseases, he seeks to fasten his venomous fangs in the flesh of every living creature, as if he took a malignant pleasure in inflicting his own agonies on all within his reach. Nor is this peculiarity confined to the rabid dog. All animals that naturally use their teeth as weapons of offense, when attacked by the violent type of rabies are seized with a similar uncontrollable desire to bite; and as the saliva of the sick is alike virulent in all genera, the danger of the propagation of the malady in this way is very great. The losses from rabies among men and farm animals run far higher than is generally supposed, and are confined to no season, the popular prejudice against the *dog days* to the contrary notwithstanding. In seeking to reduce these or obviate them altogether much is to be done in the way of—first, regulating the keeping of dogs; second, in advice for the private management of dogs by their owners; third, in protection against the free importation of dogs from countries in which rabies abounds; fourth, in acquainting the general public as to the early symptoms of rabies; fifth, in the destruction of all rabid dogs and of all exposed animals that naturally use their teeth as weapons of offense; sixth, in the supervision and frequent examination of exposed animals of genera that do not use the teeth, for a sufficient length of time to insure that no form of the disease, either of a violent or occult type, shall be developed. The destruction of the rabid animal may safely be left to people in the locality, but further precautions would demand the interference of a board of health; hence all cases of rabies should be reported to it, that suitable protective measures may be taken.

MALIGNANT ANTHRAX IN ALL DOMESTIC ANIMALS, AND MALIGNANT
PUSTULE AND INTESTINAL ANTHRAX (MYCOSIS) IN MAN.

In all the protean forms of malignant anthrax in animals, we find an infecting material which is not only deadly to quadrupeds,

birds, and even reptiles and fishes, but which may be successfully inoculated from any one of these upon the human subject. The malady when conveyed to the human being is a very deadly one, whether it shows itself on the surface in the form of malignant pustule (Siberian boil plague), or internally, as *carbuncular sore throat* or *intestinal anthrax*. In this country it prevails mostly among butchers, tanners, and workers in hair, but is also well known as the result of consuming the flesh of infected animals. Infection from simple contact is by no means uncommon. Quite recently I saw an outbreak in which 100 cattle and 3 men suffered. In a second, 12 cattle and 2 men. In a third, a cat conveyed the malady to a young lady who nursed it. Where the disease becomes widespread, the resulting human mortality may be excessive, as when in 1770, 15,000 men died in six weeks, in San Domingo, from eating the diseased beef. Cooking is a very insufficient protection, as the resting spores have been shown to survive a boiling temperature, and, in particular cases, even 300 Far., and a whole family were poisoned in Aberdeen, Scotland, by the beef that had been boiled for hours in broth. Further, and contrary to what holds with most forms of virus, it is not essential that the skin should be broken in order to its absorption, and numerous instances can be adduced in which fatal results followed when it was deposited on the sound skin. Frost has no influence on its potency, and I have known a number of animals fatally infected by licking the blood from a stoneboat, when the temperature was below zero. Nor is time nor putrefaction to be relied on. I have known cattle to perish promptly after lapping the liquids that leached from a grave in which an infected carcass had been buried nearly a year before. I have further known pastures, on which the disease had been developed for the first time in the memory of the inhabitants, maintain their infecting qualities for six years in succession and to yield hay which continued to infect animals when fed to them at a distance from such pastures.

Being enthetic rather than infectious, this malady fortunately rarely attains to the dimensions of a plague, and rarely extends very widely from its true sources of origin. These are mostly in damp lands with a soil rich in decomposing organic matters, and

especially such as have an impervious subsoil, or which, by reason of the basin-like conformation of the locality, has no sufficient drainage. Rich river-bottoms and drying-up marshes, ponds, and lakes, lands that have been overmanured, and those supplied by drinking-water collected from the surface or from strata rich in organic remains, are especially likely to be centers for the reception and preservation of this poison. In such localities, those animals are especially liable to contract the disease which are already in a somewhat morbid condition, excessively plethoric, having the blood charged with hurtful elements, the result of disease, faulty diet, or imperfect elimination, that have had secretions retained or fever developed in connection with hot dry seasons, lack of water, gastric and intestinal impactions, hot close buildings, insolation or excessive alternations of midday heat or midnight cold, and finally those in which from rapid growth or assimilation the tissues are soft, lax, and watery. With such animals, and in such localities, the disease is very liable to appear, and to continue to appear with increasing frequency and fatality, so that such places come to be known as "*dead lots*," and are avoided by all judicious stock-owners. The malady is always confined to limited districts, unless where the above-named conditions extend over a wide territory, as in the rich alluvial steppes of Eastern Europe and Asia, in the plains of India, and in certain of our own rich river-bottoms and prairies. It deserves to be stated that, like malarious fevers in man, this affection has become increasingly frequent throughout the United States in the past few years. While there is a strong probability that the disease is due to microphyte—*bacillus anthracis*—which is found in the blood in all the worst cases, and that certain conditions of the animal system are necessary to cause it to branch out into its special pathogenic development; yet, when its virulency has once been acquired, it maintains this through an indefinite number of generations of the virus, and proves one of the most indestructible of known contagia.

Like glanders and rabies, therefore, this disease will demand a careful control by a National Board of Health, and measures must be resorted to for limiting its area and extirpating it

wherever it threatens to attain a dangerous prevalence.

TUBERCULOSIS IN ANIMALS AND MAN.

It is only since the inoculation experiments of Villemin that the dangers resulting from tuberculous animals have been at all appreciated. To-day after ten years of experimental observations by Villemin, Viscar, Klebs, Zurn, Bollinger, Leisering, Chauveau, Bagg, Semmer, Guenther, Harms, Biffi, Virgad, Gerlach, Buhl, Tilbury Fox, Burden Sanderson, and a host of others, it has been definitely established: 1st, that tuberculosis can be transmitted from animal to animal, from man to animals, and presumably from animals to man, by inoculation, or by the accidental contact of tuberculous matter with a raw or abraded surface; 2d, that raw, tuberculous matter taken from man and animals and eaten by other animals may determine tuberculosis in the latter; 3d, that even the flesh of tuberculous animals will sometimes produce tuberculosis in animals that consume it, though with less certainty than if the tubercle itself were taken; 4th, that the milk of tuberculous animals will at times produce tuberculosis in susceptible subjects, and above all where the morbid deposit has taken place in the udder; 5th, that cooking of the tuberculous matter gives no guarantee of protection, as flesh is a poor conductor of heat, and tubercle that had been boiled from a quarter to half an hour has readily infected a number of animals that partook of it; 6th, that tuberculous matter mixed with water and thrown into the air with an atomizer causes with great regularity the development of the tubercles in the lungs of animals respiring such air. The above conclusions will admit of some qualifications. It may be admitted, for example, that the consumption of the flesh and milk of tuberculous animals is often followed by no perceptible injury. Phthisical cows are often eaten without causing obvious disease in the consumers. I have known large dairies of tuberculous cows, in the hands of vigorous and healthy-looking owners, who consumed the milk freely. I have kept two rabbits consuming *all* the milk of a tuberculous cow for months, and until the latter died without developing any signs of tuberculosis in the rabbits. I have kept other rabbits for two months

on the milk of a cow suffering from acute tuberculosis without any appreciable evil result. It may be freely concluded that a large number of individuals while in the enjoyment of robust health will withstand the influence of tubercle taken in the stomach, but it must be otherwise with the weak and young, those with poor feeding and worse air, those living in damp sunless localities, and subjected to much exposure. In a case that recently came under my notice in Brooklyn, N. Y., a family cow was found in an advanced state of tuberculosis, and the owner (William Martin) and his wife were rapidly sinking under the same malady. In another case reported to me by Dr. Corlies, of New Jersey, a family cow supposed to be suffering from lung plague was found to be afflicted with tuberculosis instead, and the owner's wife (a consumptive), who had been making free use of the milk warm from the cow, was persuaded to give it up and underwent an immediate and decided improvement. It is for infants and adults who are somewhat infirm and out of health, or whose surroundings are not of the most salubrious kind, that the danger is greatest, but this embraces such an extended class that the moral interests involved are almost illimitable. The destruction of infancy and wasting of manhood from this cause is unquestionably far greater than has been heretofore realized; and on the moral ground alone this subject demands the watchful attention of a board of health. But even as a financial question, and as estimated in the losses in live stock alone, the subject attains to wide proportions. The infection of tubercle once introduced will often extend from the single diseased animal to a whole herd with startling rapidity. Last winter I visited a herd of sixty Devon cattle that were reported as perfectly sound six years ago. At that time a bull was bought which proved tuberculous, and the disease had steadily increased until at the time of my visit there was not a sound animal on the premises. Into a second herd nine poor calves were introduced in the fall of 1878. They were afflicted with a cough which soon attacked the five other calves on the place, the eight cows, and two cows of a neighbor that pastured with them. At the time of my visit in the spring of 1879 all showed distinct symptoms of tuberculosis.

These may be thought to be extreme cases, but I am acquainted with districts in which 30 per cent. of the cattle suffer from tuberculosis, and with many high priced herds in which this scourge yearly claims its victims. In his experiments Professor Gerlach had to utterly discard certain strains of high-bred swine, because of the astonishing frequency of tuberculosis in these subjects.

This disease opens up an extensive field for sanitary work, and particularly in the neighborhood of large cities, where so many infants, subjected to all the depressing influences of city life, are sustained by the milk of cows kept in unwholesome stables and fed so as to secure the greatest possible yield of milk, irrespective of results. Here the environment of the cows that yield the milk and that of the children who consume it are altogether favorable to tubercule, and the subject requires the most careful supervision of the sanitary authorities.

The great mass of the adult city population is only a degree better in this respect than the infants; and as the cattle that are no longer useful for milk are too often made into beef, or rather sausages, the children of a larger growth are confronted with the risk of tuberculous meat as well as infected milk. The same dangers attend on the country districts, and though they are to some extent counteracted by pure air and better surroundings, yet the taint, if once introduced into a herd, tends to undergo a steady increase, until, as in the case of the country herds I have referred to above, all fall under its baleful influence. Then, again, in most of our large cities the cows are not kept over one season, but are constantly being replaced by fresh ones from the country; and it is only by purifying the source of the trade that we can secure sound cows in the cities.

That a supervision and restriction of tuberculosis is demanded cannot for a moment be gainsaid; but in view of the enormous proportions of such a work and the great monetary interests involved, together with the recent data of all exact observations on the transmissibility of the contagion and the different results obtained in different cases, it would be well, before proceeding far in this matter, to conduct a series of experiments which would tend to determine more accurately the conditions in which the

different products are virulent and the circumstances in which exposed animals are susceptible. The proper supervision of this affection will demand the most careful consideration of the soundest and most enlightened minds. It would demand—first, the enforcement of a series of sanitary rules for the construction and management of city and suburban cow-stables, embracing the sites, exposure, drainage, space per animal, ventilation, water supply, food, cleanliness, &c.; second, a professional inspection of the cow stables to insure that no cow with active tuberculosis is kept for the supply of milk, and no bull for the propagation of his kind; third, a professional inspection of the slaughter-houses and poulterers' to see that no flesh or other products from dangerously tuberculous animals are allowed to pass into consumption as human food. As far as possible a sanitary control should be established over country herds as well, and means should be taken to extirpate the disease and remove its causes in the many districts in which the affection has become domiciled as an enzootic.

MALIGNANT (ASIATIC) CHOLERA.

With the threatened approach of a new visitation of cholera the National Board of Health must apply to the lower animals all those precautions which have proved beneficial in warding off this scourge from the human race. In this connection it need only be stated that Annesley, Jamieson, and many other Indian physicians testify that during cholera epidemics the domestic quadrupeds often showed a greater mortality than man, and that poultry yards were utterly depopulated by the scourge; that Hildebrandt, Hering, Dick, Reynal, and others record the ravages of this plague simultaneously in man and animals in Europe; and that Burden Sanderson and others have produced the disease experimentally in the rodents by feeding paper dipped in the virulent alvine discharges of men. It has often been noticed that birds disappeared during the cholera epidemics, the rational explanation being that they perish. This will especially demand the careful seclusion of all animals in cholera districts; the destruction, if necessary, of wild animals; the disinfection of all bowel dejections and of the carcasses of animals dying of the plague, as

well as of the places and loose objects where the sick have been ; and, lastly, the most careful attention to prevent further infection through fodder, litter, or other solids, and through surface or underground drainage, natural or artificial, into wells or streams, into contact with the food of men or animals or the places where animals resort to lick the soil. It is evident that no system of protection can be effective that fails to recognize that the lower animals transmit this virus as well as suffer its consequences.

MILK SICKNESS. THE TREMBLES.

The great importance of this disease has failed to be recognized, mainly because its source is to be found in certain backwoods districts rarely penetrated by those who preside over our medical literature, and because it gradually recedes before the advance of improved agriculture. Many medical men indeed express grave doubts as to its very existence. Yet the history of the malady is so circumstantial and clear that a doubt as to its specific nature is eminently disingenuous. In its source in unimproved marshy localities it closely resembles the malignant anthrax, also in its communicability to all animals, but it differs essentially in that it fails to show local anthrax lesions, in place of which it expends its energy on the nerve centres, producing great hebetude and loss of muscular power. According to Dr. Phillips, it is characterized by the presence in the blood of a microzým (spirillum), like that seen in relapsing fever. The germ is probably derived from the drinking-water or the surfaces of vegetables, as certain wells are found to infect with certainty, and the disease has been repeatedly produced by feeding upon particular plants (*Rhus toxicodendron*, &c.). That these plants in themselves are not the pathogenic elements, is shown by their innocuous properties when grown in places out of the region of the milk-sickness infection. It seems altogether probable that here, as in malignant anthrax, we are dealing with a microzým which has developed pathogenic properties and which can be reproduced indefinitely in the bodies of living animals. The great danger of this affection consists in the conveyance of the germ with unimpaired potency through the flesh and milk and through the man-

ufactured products of the latter—butter and cheese. Some even hold that in animals giving milk the system does not suffer materially, but that it is saved by the drainage of the germs through the mammary glands, and that thus a milk-sick cow may remain for a considerable time unsuspected, while her milk, butter, and cheese are conveying mental and physical decay and death to many human beings, near and remote. For the disorder proves as fatal in man as in animals, and if in particular cases it fails to destroy life, it usually leaves the subject in a condition of hebetude and physical weakness that makes life miserable.

The permanence of the germ in butter and cheese renders inevitable the conclusion of physicians in milk-sick districts, that cases of this disease must be frequent in city populations, but that its true nature is not recognised by the medical attendants. The whole subject demands a thorough experimental investigation at the hands of the National Board of Health, so that the true source and germ of the malady may be discovered, if possible, and that in any case intelligent measures may be taken to prevent its conveyance out of its native habitat.

SMALL-POX IN BIRDS.

In Europe and Hindostan variola is so common in pigeons and poultry as to constitute a veritable plague. Thus Guersent records that out of a dovecote of 1,000 scarce 100 could be found that did not bear marks of the disease, while Tytler says the poultry-yards in India were habitually depopulated by the plague. Bechstein and others claim that this is the true small-pox derived from the human being and conveyable back to man, while others, like Toggia and Gilbert, assert that it is communicable to the sheep. That this affection has not been recognized among us may be due to a difference in the environment which modifies the infection, or, perhaps, to the fact that men and pigeons do not live so much in common here as in Italy and India. Such an occurrence under Italian skies should, however, demand a careful investigation into the reality of such infection in our own States, and especially the Southern ones, during the prevalence of an epidemic of small-pox, so that whatever danger arises from this source may be detected and guarded against.

ECZEMATOUS (APHTHOUS) FEVER IN ANIMALS.

Although this disease is communicable to man in a mild form, and to infants who live on the fresh milk in the form of a violent and even fatal inflammation, yet, as it has at present no foothold on this continent, and, like rinderpest, sheep-pox, dourine, quebra bunda, &c., may be easily excluded by inspection and quarantine at our ports, it will be best to leave it with the purely animal plagues to the control of a veterinary sanitary bureau, and thus avoid the multiplying of inspectors.

TYPHOID FEVER IN SUCKING CALVES.

Reports have lately been published of the occurrence of this disease in calves, and of the infection of a number of persons that have eaten of the veal; it seems very desirable, therefore, that experiments should be instituted to ascertain whether animals kept on an exclusively milk diet are susceptible to this infection of man. It seems altogether probable that a mistake has been made and that the calves and their victims died of trichiniasis, intestinal anthrax, or of some other poison common to man and animals; but it should at least be shown by the National Health Board that the danger of the alleged transmission of typhoid fever is altogether fanciful.

TRICHINIASIS.

The life-history of the *trichina spiralis* is now fairly understood. The parasite is harbored by very many mammalia and probably even by reptiles, but is, above all, common in rats, pigs, and men. It has its two principal stages of existence—the *sexually mature* form, which lives and propagates its kind in the intestines only, and the *immature asexual* form, which, born in the intestines, bores its way through their walls and into the voluntary muscles, where it encysts itself. These last attain maturity only when their host is devoured by a carnivorous animal, and when the cyst is digested off so as to set the imprisoned trichina free. A third habitat may be named for those embryos that have been carried out of the system by the prevailing diarrhoea ere they have

had time to penetrate the intestinal walls and seek an asylum in the solid tissues. These can live for an indefinite length of time in pools of water without undergoing further development, until they are taken in by a mammalian host, when they penetrate the intestinal walls and encyst themselves in the muscles.

All this has been known for many years, but sanitation has advanced no further than to advise the microscopical examination of all pork, to enjoin that it be thoroughly smoked or well cooked before it is eaten, and to utter a warning against keeping pigs about slaughter-houses and feeding them on the raw waste products. Meanwhile, our pork hams have been, rightly or wrongly, acquiring a most undesirable reputation. Dr. Belfield and Mr. Atwood, of Chicago, pronounce 8 per cent. of the hogs killed in that city to be trichinous, and several European countries have forbidden the importation of American hams. In Germany, on the other hand, where all pork is subjected to microscopic examination, the statistics show that trichina have been found in but one of 2,000 hogs examined.

The protection of our population against this tremendous scourge, and of our market against the embargoes of frightened Europeans, demands a system which shall reach further and prove more thorough. The feeding of pigs on any flesh that is not thoroughly cooked should be strictly prohibited, a trichina inspector should be made to examine all pork exposed for sale, in cities especially, and any discovery of trichinous pork, whether from such inspections or from the occurrence of the disease in man, should lead to such inquiries as would in all possible cases discover the source of such pork, and then should follow the destruction and prolonged boilings of all hogs, dogs, cats, rats, mice, snakes, and other carnivorous animals on the premises, the burning of the hog-pens and manure and the closure of the yards against hogs for one year; also, the shutting up of all wells or other collections of water to which the swine may have had access or into which drainage from the pens could have taken place.

Further, examination should be made in such localities of all animals, vertebrate and invertebrate, that the hogs could be

expected to have devoured. Under such a system not only may we hope for a material decrease of trichinous hams and bacon, but for valuable discoveries of hitherto unsuspected and dangerous hosts of parasites, so that the work of extermination would continually become more easy and effectual.

ECHINOCOCCUS.

In all countries where it abounds (Iceland) this is one of the most destructive of the parasites of man. In the United States it is by no means so common as to give rise to much apprehension, and yet an examination of the internal organs of animals slaughtered, and a consultation of medical records, show that it is far from uncommon. As the parasite is derived from the dog, and as its *tænia* form in the bowels of that animal is so small as to be rarely recognized, it is likely to cause great damage before its presence is suspected in a locality. This is but one of a myriad of heavy charges that must be brought against the crowds of useless curs that everywhere abound, and more or less directly impair the health and prosperity of the people. With man alone the dog reciprocates in sustaining no less than seven dangerous animal parasites, in addition to the vegetable ones, producing the different forms of ringworm; with cattle and sheep he joins in maintaining three that devastate our herds and flocks. His ubiquity is a continual threat of canine madness to all living things. He has remanded to nature, or to less productive culture, large tracts that are admirably adapted to the raising of sheep, but where the losses from the devouring jaws of the dog have rendered sheep farming unprofitable. Sanitary considerations, alike affecting man and beast, therefore demand a rigid control of dogs and the imposition of a tax that shall be to a large extent prohibitory of their maintenance. Further, whenever *echinococcus*, *cysticercus tennicollis*, *Bothriocephalus latus*, *B. cordatus*, *Strongylus gigas*, *Pentastoma tænioides*, or *Demodex folliculorum* occur in man, attention should be given to the condition of the dogs in the locality, and measures taken to prevent the propagation of these parasites through their systems.

OTHER PARASITES.

To go over the other parasites which are common to man and animals would serve no good purpose. They rarely attain to the gravity of an epidemic, and will only demand sanitary interference in very exceptional circumstances; yet the Board of Health must be so constituted that it can effectually deal with any of these in such an emergency. For this, a veterinary sanitary committee will be always prepared, and will act mainly as an advisory body; but also, when necessary, in an executive capacity. Thus, an influx of measly pork should demand that it be traced to its source, and that its source, the tapeworm of man (*T. solium*), should be destroyed, while all pigs should be forbidden the infected ground for over a year. An influx of measly veal should demand a similar correction, and thus dangers of a material increase of either of these parasites will be done away with. In fishing localities where the *Bothriocephalus latus* or *B. cordatus* gains a wide diffusion, it may become necessary to keep all dogs under the closest surveillance and to periodically rid them of the parasite. It might further become needful to control the consumption of certain fish, or of fish-eating mammals likely to be devoured by dogs. The prevalence of *Sarcoptes mutans* (scabies) in chickens may become so great that it will entail a most inveterate itch in man, the true source of which is seldom discovered. Again, *gregarina* have lately been found in the lungs of chickens, and in the bowels of pigs, and it seems quite within the bounds of probability that as they live on the hairs of man, so they may at times infest his internal organs.

For the above reasons it is desirable that Congress should provide for the incorporation with the National Board of Health of one or more veterinarians, whose functions it would be to consult with the present members in all matters in which the health of the lower animals affects that of man; to advise as to the enactment and administration of State laws for the prevention and extinction of plagues and parasites common to man and animals; to conduct experimental researches into the source, propagation, and extinction of these disorders and parasites of animals, and to act when necessary in an executive capacity in the

exclusion or control of these scourges. To carry out these objects Congress should be asked to appropriate a sum of money, to be expended, as may be seen to be best, in experiments, in investigations, and in the control of these epidemics and epizootics.

PLAGUES AND PARASITES PECULIAR TO THE LOWER ANIMALS.

In turning now to the communicable disorders of the lower animals to which man shows no susceptibility, we face a much more extended class. No less than thirteen different forms of contagia and thirty-four different parasites exist, any of which may induce a prevalence that rises to the dignity of a plague. Among the contagia given in our list the majority are probably indigenous to our soil, while four are certainly exotic. Of the latter but one (lung plague of cattle) is known to exist at present in the United States, but that one more imperatively demands instant and effective action than all our plagues of home birth. Arising in this country from contagia only and having an excessive incubation period (one to three months), it can be spread with the greatest facility by animals that carry the seeds of the malady but have not yet developed the disease. Having a constant tendency to the death of tissue and to the encystment of this as a mass (infecting material), which remains unchanged for many months in the chests of animals that are thought to have recovered, it is ever liable to be spread by the apparently convalescent. Add to this that this contagion, if once carried to our Western and Southern stock-ranges, could never be eradicated, but must remain as a permanent incubus and scourge as it has on the steppes of Russia, the open lands of Australia, and the unfenced ranges of Southern Africa, and we see reason why a prompt attention should be given to its speedy extermination. If more is wanted to enforce this, it is the calculation (based on the European losses from this plague and the steady increase of our own herds of cattle) that this pestilence, left to itself and extended to our Western stock-ranges, will probably lay us under a tax of \$130,000,000 per annum. But the flesh of animals attacked with this plague has never been shown to be injurious to man, and thus the question of its extinction is an exclusively pecuniary

one and demands the action of the stock-owner rather than the sanitarian. While the necessary steps to insure the extinction of this and allied plagues are sufficiently well known to the veterinary profession, and while effectiveness and promptitude are best secured by placing the matter in the hands of one executive head, yet it will better command the confidence of the stock-owners and indirectly of Congress, if one or two representative stockmen are officially connected with the work.

While on purely professional matters the veterinarian must of course decide, and in the execution of the work which is essentially professional he should direct, yet in many subjects connected with cattle-raising and the peculiarities of the trade in different parts of the country the knowledge and experience of the stockman will be of inestimable advantage in arriving at safe and effective local enactments that will not unnecessarily harass or hamper trade on the one hand, nor be easily evaded on the other. A small committee or bureau of this kind, clothed with executive authority and with financial means equivalent to the end, could make much more effective work than could a committee of the Board of Health, who could not get together to meet every emergency. Again, the first part of this sanitary work must be done as speedily as possible because of the great and increasing dangers that attend upon delay, and to secure this it will be necessary to appropriate a large sum of money to enable the executive to carry it on with uninterrupted energy to the end, since any suspension for lack of funds would entail the renewed spread of the disease and the loss of all that had been already expended. This consideration is a vital one, and of itself would decide me in favor of a separate executive, for the exclusively animal plagues, to be furnished with abundant means and full administrative power. A supplementary appropriation to the Board of Health, which might be largely used up for what at the moment and as viewed from a moral standpoint might appear as a more urgent demand, would be hurtful to both human and veterinary sanitation. If, for example, the work of exterminating the cattle lung plague had to be entirely arrested for want of means, it would soon again extend over the ground

which it had lost, all that had been expended on it would be forfeited, and there would be much less likelihood of a speedy resumption of the work. If even the work were only retarded for lack of means, as has been the case in New York for the past three months, if the executive could only quarantine infected herds and partially control the movement of cattle, but could not kill the sick for want of means to indemnify the owners for their losses, a most hurtful blow would be dealt to the entire system of national sanitary legislation and administration. In either case the most prominent fact before Congress and the people would be that so many hundred thousand dollars had been expended for the extinction of a plague which, when the next appropriation was requested, either prevailed as widely as at first or was only appreciably less prevalent. All representations that the want of success had been due to the lack of means would receive little attention; the community would conclude it better to squander no more money on the matter; all further veterinary sanitary legislation would probably be rendered hopeless; no small amount of opprobrium would be thrown on the National Board of Health itself, and a severe blow would be dealt to all national health legislation.

It is especially fortunate that, by reason of the active measures carried out in the first six months of our work in New York, we can now point to seven counties virtually cleared of the pestilence, and by later restricting our work to controlling movement of cattle, we have been able to prevent any renewed extension of the pest; yet with a little more means New York might have been to-day all but clear of this scourge.

The time may come when the nation will be sufficiently educated to allow the sanitation of man and animals to be controlled by a single National Health Board; but at present, and for the exclusively animal plagues, we cannot afford to run any risk, and that method should be followed which will secure a certain and speedy result, and establish the principle of the extinction of such pestilences on a sound and unassailable basis. I would therefore urge as the result of mature deliberation, in view of all aspects of the question, that the control of these

animal contagia and parasites which affect man as well should be placed in the hands of a veterinary committee of the National Board of Health organized for that purpose, while the exclusively animal plagues and the parasites that affect animals only should be committed to an organization drawn from the stock-owners and the veterinary profession, and not too large or unwieldy for the most prompt and effective action.

I consider it needless to encumber this statement by any further reference to the other animal plagues and parasites, as I would not recommend *immediate* executive action for more than the other in addition to the bovine lung-plague. Besides this, the work of the special veterinary organization would consist mainly in controlling the imports of live stock and in advising as to the management of local epizootics which did not immediately threaten the nation at large.

EDITORIAL.

The effects of the embargo placed upon the importation of American live-stock by the English Government, the difficulties and embarrassments to which it has subjected our exporters, and also the heavy losses which our agriculture must have sustained, have, no doubt, induced our Government to endeavor to have the restrictions, if not entirely removed, at least to some extent relieved. With that object in view, such powerful influences have been brought to bear, that the subject has been introduced in the House of Commons, and action in the matter applied for.

The news that reached us of the attempt made is accompanied by intelligence of the failure which befell the effort.

This is hardly an unexpected result, for after all, being as we are, without veterinary sanitary organization on the one hand, and on the other, standing so much in need of it, by reason of the presence of contagious diseases amongst our stock, it was scarcely to be hoped that our adventure in this direction would be crowned with immediate success.

We are unable, at present, to give any detailed or official information on the subject, but have no doubt that the whole question will be laid before our readers upon the return of our esteemed friend, Dr. C. P. Lyman, from his mission to England.

We are pleased, however, to be able to say that the effect of this failure is already appreciated by the American Government. One of our correspondents informs us that Gen. Patrick, already so well known by his labors in connection with the investigation of Texas fever, and lately as associated with the New York Commission on Contagious Pleuro-Pneumonia, has been requested by the Secretary of State to indicate a suitable site for a quarantine establishment on the shore of New Jersey, at Sandy Hook.

This is already quite an important step in the right direction, which, though it seems only to refer to precautionary measures on this part of the country, still indicates a desire, on our part, to take proper measures to convince foreign Governments that we are appreciating, though somewhat tardily, the necessity for the establishment of sanitary regulations.

REPORT ON DISEASES OF DOMESTIC ANIMALS.

At the period of the organization of the National Board of Health, and when it was hoped that veterinary science might be represented in the Board, requests were made by Dr. Cabell, President of that body, to a number of veterinarians, for reports on the diseases of animals as they exist in this country, and upon their influence on the general health of the community. A number of these were doubtless received by Dr. C., and in one of our exchanges, the *Bulletin of the National Board of Health*, we find the paper sent by Prof. Law. We reprint this paper for the benefit of our readers, many of whom may not have had an opportunity of seeing it before, and to whom it will, doubtless, prove interesting.

HUMAN AND ANIMAL VAROLÆ: A STUDY IN COMPARATIVE PATHOLOGY.

BY GEORGE FLEMING, F.R.C.V.S., ARMY VETERINARY INSPECTOR.

(From *The Veterinary Journal*, London, England. Reprinted from the *Lancet* for March 20th.)

(Continued from p. 199.)

What we might call the *casual evidence* as to the non-identity between human variola and cow-pox, and their being two distinct diseases of a group, is still further increased by other facts which may be mentioned. The individuality of contagious maladies is, perhaps, never more strongly marked than when we find the two affecting the same person or animal, and running their course concurrently, the various phases of one being passed through entirely independently of the evolution of the other. Such instances are far from infrequent in the practice of the physician and veterinary surgeon, and from my own experience I could relate several. But I refrain from doing so, as additional testimony of this kind is not required at this period of the nineteenth century, I hope. But in the discussion now undergoing consideration, such evidence should be borne in mind when we mention the fact, that cases are recorded in which people already infected with small-pox, and who had been vaccinated when so infected, have had the eruptions of the two diseases apparent at the same time, each preserving its special characters, undergoing its different changes, and terminating exactly as if it were totally independent of the other, and had not the slightest influence in modifying or checking its course. And more than this, Hallé is reported to have employed the lymph from the vaccine vesicles developed under these conditions, to vaccinate healthy children, and has only produced the pock of vaccinia—never small-pox. In one of Chauveau's experiments, in which a horse was inoculated with the virus of human small-pox, which gave rise to local effects, and was also inoculated with vaccine lymph, evidence of the two morbid actions operating coincidently was undeniable,

and afforded one more proof that a certain lapse of time must ensue before the preservative influence of vaccine comes into play.

However strong and abundant clinical and casual evidence may be, it is not always completely convincing, unless supported by experimental demonstration, when it is then irresistible. This evidence is also fortunately at hand, and in a most exhaustive and complete form; and it is very remarkable that, with the exception of one speaker at the conference (Dr. Cameron), its existence does not seem to have been known to those present; at least, this may be inferred from the circumstance that it was never alluded to, save in the one instance mentioned. That my surmise is not very wide of the truth, may be taken for granted, when we read of one gentleman saying, in reference to the experiments conducted by my friend, Professor Chauveau, of the Lyons Veterinary School, and briefly summarised by Dr. Cameron, that "it seemed strange that men should, at the present time, go abroad to France, to the futile and speculative experiments of a Frenchman, and take possession of the inferences he entertained." Such language betokens either ignorance of, or an utter failure to appreciate, the value of the results of these experiments; but then this speaker asserted that he had successfully inoculated a large number of cows with small-pox virus, and produced vaccinia which gave him abundant vaccine lymph.

In France, as in some other European countries, the origin of cow-pox had long been a fruitful subject for discussion and speculation and more than once it had provoked warm debates at the Paris Academy of Medicine. In 1863, M. Bouley, then director of the Alfort Veterinary School, had re-discovered at Paris the "horse-pox" of Dr. Loy, of Pickering—in reality, the "grease" of Jenner, Sacco, and others, who believed in the equine origin of cow-pox. But M. Depaul, who had also, with Bouley, studied this *vaccinogenous* disease of the horse, was inclined to follow the example of Baron and his followers, and to conclude that it and other eruptive disorders occurring in animals, and possessing analogous characters, were nothing more or less than human variola. So it was that he included sheep-pox, and the aphthous

disorder of animals known as foot-and-mouth disease, in the list of disorders having their common source in small-pox. The influence which he and Bouley possessed divided the Academy into two camps, and the result was recourse to experimentation, which happily led to the conclusion that this equine eruption was capable of producing cow-pox in the cow and vaccinia in mankind. But the burning question as to the identity of small-pox and the diverse varioliform affections of animals remained as undecided as before; no new facts of a reliable kind were brought forward, and there was nothing to talk about save the well-known contradictory circumstances which had been so often alluded to before, but which were again brought into debate with all the oratorical ability and scientific ardour for which that renowned body is remarkable. Viewing it as a purely experimental matter, as a question which could only be decided by true facts, the Society of Medical Sciences of Lyons appointed a commission to carry out this inquiry. The commission was composed of Drs. Boudet, Delore, Dupuis, Gailleton, Horand, Lortet, Meynet, and Viennois, and the veterinary professor Chauveau. The latter was the president of the commission, and on him chiefly devolved the task of experimenting on the animals. A man more competent for the onerous duty imposed upon him could not be found in Europe; his reputation in the world of medical science stands very high as a most accomplished physiologist and experimental pathologist, the result of whose experiments may be received as absolutely trustworthy. Drs. Viennois and Maynet were secretaries, and the three drew up the final report, which was presented in 1865. On March 5th, 1866, the French Academy of Science awarded the Montyon prize, value 2,500 francs, to Chauveau and his two colleagues, Viennois and Maynet, and gave honorable mention to the other members of the commission. This award was made on the recommendation of a commission appointed by the Academy, and constituted by such men as Claude Bernard, Serres, Velpeau, Cloquet, Joubert, Flourens, Rayer, Milne Edwards, and Longet, who gave their opinion as to the great interest and value of the Lyons investigations. This commission, aware that the medical profession had been divided in opinion as to whether, if

human variola were inoculated on the cow, it could be so modified as to produce true primary vaccinia, or whether variola was so foreign to the bovine species that its inoculation in cattle was impossible, alludes to the ability of Chauveau, and to the results of his labours, which demonstrated that the truth lay on neither side. These results proved that human variola could be inoculated on the cow and horse with the same certainty as vaccinia; but they also showed, contrary to what takes place in the human subject, that the primary effects produced by inoculation with the two viruses were absolutely different. Thus, with the ox, the small-pox virus only determines a local eruption of papules, often so small that they would pass unperceived if one were not warned of their existence. Hence the mistake made by some experimenters, who have denied that small-pox could be inoculated on bovines. The vaccine virus, on the other hand, engenders the typical pustular eruption, with its large characteristic *boutons*.

Analogous differences are observed, continue the Academy commissioners, on animals of the equine species. These differences are still more manifest in the same animal inoculated simultaneously with the two viruses; the two eruptions are then developed simultaneously without appearing to influence each other, and preserve their special characters. But the two viruses are not less capable of acting one on the other, and so reciprocally neutralising each other—just as in man—when inoculated successively on the same animal. In fact, human small-pox generally fails on vaccinated animals, while the vaccine virus as commonly fails on those which have been previously submitted to variolous inoculation. In no case had Chauveau and his colleagues seen the slightest tendency to *rapprochement* between the characters of the two eruptions in the horse and ox. In attempting to cultivate the variolic virus on these two species, they have even discovered that it cannot become acclimatised in them, and that, with the ox in particular, it becomes impotent at the second or third generation; while the vaccine disease is propagated indefinitely from one individual to another. With regard to inoculation of man with this variolic virus which had been transiently (*passagèrement*) implanted in the organism of animals,

this only engenders small-pox, neither more nor less, just as does the variolous virus obtained direct from the human species. The eruption is sometimes discrete and benignant, sometimes confluent and serious—at times normal, at other times abnormal. But in all cases the disease preserves its property of infecting healthy individuals by miasmatic contagion (infection); and its virus, even when taken from an almost absolutely local eruption, never gives more, in bovine animals, than the papular eruption which ordinary human variola produces in these creatures.

The Academy of Sciences commissioners conclude their verdict as follows:—"The experiments, the results of which have been just mentioned—experiments as remarkable by their number as by their distinctness (*netteté*) and concordance—appear, therefore, proper to solve the debatable points in view of which they were instituted. In establishing that vaccinia and variola, notwithstanding the features which assimilate them in animals as in man, are, nevertheless, totally independent of each other; that their viruses form two distinct individualities; that the two affections thus constitute two different, immutable species, which cannot be transformed one into the other; that, consequently, to seek to produce vaccinia from variola would be to pursue a dangerous chimera, which would revive all the dangers of inoculation of by-gone days—in establishing facts of such great importance, the experiments directed by M. Chauveau have rendered an incontestable service to science and to medical practice."

Such was the opinion expressed by the representatives of the Academy of Sciences with regard to the Lyons experiments, and after reading the account of them, and knowing well the very trustworthy character and great professional ability of M. Chauveau, I think no doubt whatever can be entertained as to the justness of that opinion. And, besides, it must be remembered that an Italian medical commission, which carried on similar experiments and investigations at Turin, from 1871 to 1874, came to the same conclusion that Chauveau did—that human small-pox cannot be converted into cow-pox when the virus is transferred to bovines, but always preserves its original character.

The advantage and opportunities the Lyons commission could avail themselves of were very great. The magnificent veterinary school of that city was placed at their disposal, with as many horses as they required for experiment, as well as lodging and food for the other numerous animals they employed in their investigations. The 160 cows and bulls, and 40 pigs, at the Imperial Agricultural School of Saulsaie, were at their service; as well as about 100 cows and numerous sheep and goats at a large farm near Lyons. For experiments on the human species, the *service des vaccinations* as the Hôpital de la Charité, presided over by Drs. Berne and Delore, as well as a member of the commission—M. Horand—was made available. The experiments were conducted with the greatest care and deliberation, and were very numerous; the observations on them were drawn up by Dr. Horand. They were divided into two orders or sets; one order of experiments with vaccine virus, another with that of human small-pox. Each of these again was arranged in series, and each experiment in the series is described in detail in the report.

The variola experiments are those which have most interest and importance for us, so far as the identity of small-pox and vaccination are concerned; though those with vaccinia have a more or less direct bearing on these, as well as on animal vaccination. More especially is it necessary to refer to the results of the first group, in order to refute the statement made at the London conference, that the small-pox matter was merely deposited in a little pouch in the cow's skin, and then re-transferred to the human subject, to whom it gave small-pox. Quite cognisant of what had already been achieved in this direction, the greatest circumspection was observed in guarding against fallacious conclusions; and the perfect knowledge possessed by Chauveau of the nature and habits of animals, their structure and diseases, as well as of experimental methods, was certainly an advantage of which few, if any, previous investigators could boast.

In order to study variola inoculated on the bovine species, twelve animals were selected which were known not to have had cow-pox. Of these, nine were cow or bull-calves, two were recently-calved milch cows, and one a six-year-old pregnant cow.

They were all inoculated with small-pox matter, between December and April, the material being obtained from four people who were affected with small-pox, and who had never been vaccinated; it was always employed very fresh. The inoculations were made at the vulva in the females, and perineum and scrotum in the males, and exactly in the same way as in vaccinating—the punctures being sometimes subepidermic, at other times quite subcutaneous. In none of the animals were there observed the slightest general phenomena—no disseminated eruption, fever, loss of appetite, or diminution of the lacteal secretion. With regard to the local phenomena, they were so trifling that in a first series of experiments they were inappreciable; hence the error of some of the preceding experimenters, who conclude that cattle could not be successfully inoculated with Small-pox virus. But other experiments prove this to be a fallacy; and a drawing accompanying the report shows the perineal region of a bull-calf, and on the left side of which five sub-epidermic variolous inoculations had been made, and the effect of which had arrived at its *summum* of development. There were small, red, slightly-prominent papules, from two to four millimeters in diameter, and slightly conical, in the centre of which the inoculation-puncture could be distinguished. These papules commenced to develop on the second day, and on the fifth had arrived at the dimensions shown in the drawing. On the twelfth day they had completely disappeared, after furnishing at the seat of puncture, an extremely small, darkish crust. The course was not observed, however, in all the twelve inoculated animals; but it was remarked that the deep punctures did not furnish more evident results than the subepidermic ones. The former, though made with a canulated needle highly charged with virus, only gave rise, indeed, to an eruption in which the papules were not so red or circumscribed as in the latter, and frequently could only be distinguished in the skin by passing the finger over them. Some deep inoculations were made by passing the virus through a wound several millimeters in extent, made by a lancet. The results were no more marked.

(To be continued.)

EXTRACTS FROM FOREIGN JOURNALS.

THE VETERINARY DEPARTMENT OF THE PRIVY COUNCIL.

Referring to the Report, the *Lancet* says: "However, at last foot and mouth disease has been nearly got rid of, and contagious pleuro-pneumonia is greatly diminished, though far from being extinguished. It is somewhat singular, that in view of the persistency of the last mentioned disease, the Government should ignore the benefits to be derived from protective inoculation. It is painful to read of the destruction of entire herds of cattle, only one or two of which are diseased, without this measure, the benefits of which are now placed beyond doubt, being at least tried." * * * "Glanders amongst horses is on the increase, and the returns evidently do not represent a tithe of the cases occurring. Everything appears to be left to chance with regard to this dangerous disease; there is no compulsion in the matter of reporting the existence of the malady, nor yet any attempt to have the source of those cases which are reported." * * * "From the same report it is stated that foot and mouth disease was detected among sheep imported from the United States; yet, strange to say, from all we can learn the disease is now unknown there." * * * "American swine are largely infected with trichinæ, yet nothing is done to protect the pork-eating public from this source of danger." * * * The article finishes, "no account is taken of that terrifying and far from rare disease, rabies; nor is any mention made of anthrax, a malady of rather rare occurrence, but very fatal in different parts of the country, and being transmissible to various species of animals and man." * * * Tuberculosis of cattle, also, is unmentioned, though the disorder is rather rife and apparently on the increase. We wonder if the Government has heard of it and of the recent startling disclosures made with regard to its communicability, not only by inoculation but by injections of the milk or flesh of diseased cows, as well as its infectiousness through the respiratory organs."

If the *Lancet*, the leading medical organ of England, wonders

at this report of the Veterinary Department of the Privy Council, we would like to know what the medical papers of the United States would say, if they knew of the state of health of the domestic animals in this country.—(Ed.)

TRANSMISSIBILITY OF TUBERCULOSIS BY THE MILK AND THE JUICE OF RAW MEATS.

In order to elucidate the question of the transmission of tuberculosis with milk, Mr. Pench has experimented with that of a cow, suffering with the disease, and giving only three or four liters of milk a day. This was given to two young pigs and two rabbits. The results obtained tend to prove that tuberculosis is transmissible by the milk, such as taken from the cow. After presenting this report Mr. Bouley presented a bottle containing portions of lungs, liver, spleen, the phrenic center of the diaphragm and bronchia and sub-maxillary ganglions obtained from a five months old pig, killed sixty-seven days after the inoculation of two cubic centimeters of juice of meat, obtaining by pressure of a piece of the ischio-tibial muscles of the same tuberculous cow. The lesions were those of a very advanced stage of disease.

Mr. Bouley says that these facts prove in an incontestible manner the transmissibility of tuberculosis by the milk, not boiled, and by the inoculation of the juice of raw meat. The danger is manifest and it is necessary that the public should be put on their guard—the inspection of slaughter houses must be more rigorous than now.—(*Gazette Medicale*.)

THE ETIOLOGY OF ANTHRAX.

In a communication to the Academy of Sciences, Mr. Pasteur, after recording the recent researches he had made on the subject, and without any expression of surprise that the Academy should doubt the exactitude of the facts he had presented regarding the contagious properties of the earth, which is such a powerful sifter, says: "The members of the Academy will be very much

surprised to hear the explanations of the enigma I have presented. Perhaps they will be startled at the thought that the germ theory, scarcely yet introduced into experimental researches, should reserve for science and its applications discoveries so little expected. Earth-worms are the messengers of the germs of anthrax. It is these who from the depths of the burying grounds, bring back to the surface of the earth the terrible parasite. It is in the small cylinders of earth with the very fine earthy particles which these worms discharge and leave at the surface of the ground, after the dews of morning or after rain, that with many other germs, those of anthrax are found. An experiment will easily demonstrate this. Take some earth, mixed with spores of bacteridies, containing the worms; let their bodies be opened after several days, using all necessary care to extract from them the earthy cylinders contained in their intestines, and a great number of carbuncular spores will be found. It is evident that if the soft earth of the surface of the graves of carbunculous animals contain germs of anthrax and often in large quantities, those germs come from the disintegration, by the rain, of the small excrementitial cylinders of the worms. The segregated dust of the earth is thrown on the plants near the spot and thus the animals which feed upon them receive the germs of anthrax, with which they become infected as we have seen in our experiments in soiling fresh clover.—*Gazette Medicale*.

UPON THE GASTRODISCUS SONSINOII, (COBBOLD,) PARASITE OF THE HORSE.

By M. MEGNIN.

In 1876 a strange parasite was discovered, in a horse, in Egypt, by an Italian Veterinarian, who sent it to Dr. P. Sonsino. It was sent to Profs. Cobbold, of London, and Leuckart, of Leipzig. Those learned helminthologists recognized it for an entirely new specie, of the order of the Trematodes, a group of the Amphistomains; they made for him a new gender. *Gastrodiscus*, (Lunkhart) and named it *Gastrodiscus Sonsinoii* (Cobbold).

This parasite was remarkable by its orbicular shape, discoidal, with concave ventral face, covered by hundreds of little papillo-ventruses; with smooth and rounded dorsal face; presenting anteriorly a buccal ventruse at the extremity of a small neck, and a second ventruse, much larger, at the opposite extremity, to the posterior border of the body.

The parasite has been recently found at Guadaloupe, on a mule, the third one, which died of a disease so rapidly fatal that a case of poisoning was suspected. The parasites were found in very great numbers, covering the digestive mucous membrane, from the pharynx to the anus, its species being easily recognized, thanks to the report of Mr. Cobbold. We, however, observed, some slight errors in the description he gave of it: for instance, he places the genital pore in the middle of the neck, while it is at the base of that region on the ventral face, and generally concealed by a fold of the border of the body; this border is thin and membranous all round; it shrinks ordinarily in alcohol, which makes the ventral face of the animal look as if hollowed out and thick at its border. Cobbold describes it in this manner, while in reality the ventral face is flat, and continues without interruption with the thin membranous border of the body, which is spread in all directions as the fins of a turbot, of which this parasite represents almost a miniature. The dimensions are from 13 to 15 millimetres in length, and from 10 to 12 in width, the difference being entirely due to the length of the neck. The member of the papillo-ventruses, which cover the internal face of the body, is about 450.

The parasites of the trematodes order are very rare in the horse; this is analogous to the *amphistomium conicum* (Dies) which lives in the digestive organs of the ox, but which is far from being as dangerous.—*Society of Biology*.

SPLENIC FEVER ABROAD.

The S. S. "Iowa" from Boston has lately landed 804 head of cattle alive, and one dead, at Birkenhead. Forty-three died during the passage across and were thrown overboard. On beginning to slaughter, it was found that some of the cattle were

affected with splenic fever. Two carcasses were seized for this cause on the 7th inst., and six more on the following day. An order to destroy eight carcasses was, on the 9th, applied for and obtained. Several of the remaining animals already show signs of the disease, and the slaughtering is being proceeded with under the supervision of the officers of the sanitary authority. The fever appears to be of a mild type, there being no carbuncles, abscesses or erysipelas. Some of the animals, however, have shown marked head symptoms, and there appears to be no doubt about the malady being really *sang de rate*.—(*The Lancet*.)

AMERICAN VETERINARY COLLEGE.

EXTRACTS FROM THE ANNUAL REPORT OF THE HOSPITAL DEPARTMENT OF THE AMERICAN VETERINARY COLLEGE.

The number of animals brought before the class during the year ending March, 1880, either for treatment or post mortem examination, was 2442, an increase of 546 on the number of last year. They are represented as follows: 2198 horses, 12 donkeys, 3 mules, 6 cows, 13 goats, 171 dogs, 13 cats, 2 chickens, 1 rabbit. The balance consisted of animals kindly sent for autopsies from the menagerie of the Central Park by the superintendent, Mr. W. Conklin. They were, 9 monkeys, 2 lions, 2 camels, 1 bear, 2 tapirs, 1 buffalo, 1 fox, 2 sheep, 1 panther, 1 deer, 1 swan. The classification of diseases as represented by these animals is as follows:

1077	for diseases of locomotion.
205	" " digestion.
204	" " respiration.
119	" " circulation.
70	" " genito urinary apparatus.
68	" " innervation.
141	" " special senses.
186	" abnormal growths.
372	" examination of soundness.

The animals that died or were destroyed had post mortem examinations made on the cadavers, which, with the dead animals that were brought to the college, made the number of autopsies count 158.

Five hundred and sixty-six operations were performed.

The attendance on the free clinics, which are held twice a week under the direction of the medical staff and the professors of the college, amounted to 495 animals, amongst which 91 were submitted to different operations.

VETERINARY SCIENCE IN AMERICA.

The following are extracted from a letter to the *Veterinarian* written by Mr. R. Jennings, Jr., V.S., of Pittsburgh, Pa., and published in the August number of that journal. As the passages seem to reflect upon the doings of the United States Veterinary Medical Association, and as many of the first originators of the Association are still living and still members of that body, we have thought the extracts would prove interesting and worthy of correction at the hands of those members. Reference to the minutes of the Association will, as Mr. Jennings says, bring the truth to the front.—[Ed. A. V. R.]

"I now believe I have made this subject clear, if not, I must admit my inability to do so. If the statements of American veterinary history made by this author were 'unjust' and 'unfair,' where was Mr. Jennings, the planner of the United States Veterinary Association, at the opening meeting at which the paper was read?

"Not knowing at what meeting the paper was produced, I cannot answer the question. But I do know that the graduates of English and French schools were not in sympathy with American veterinary practitioners, nor have they ever been. As proof number one, J. Horsburgh, M.R.C.V.S., visited the United States in 1853. He says, 'I visited the cities of Philadelphia, New

York, Newark, Dunkirk, Cleveland, Columbus, Covington and Cincinnati, and, unless it be in New York, in all these places and the surrounding country for a distance of 1200 miles, there is not one qualified veterinary surgeon.'—*Veterinarian*, 1854, p. 252.

"Having said this much, I will attempt an answer, providing you, gentlemen, will bear with me a few moments by showing the one-sided turn taken by the U. S. V. M. A., after the convention of veterinary surgeons assembled in the city of New York, in June, 1863. When the call for an election of officers to serve one year was made, the following names for president were presented: Robert Jennings, of New Jersey, and J. H. Stickney, a graduate of the English and French veterinary schools, the youngest man, with one or two exceptions, in the convention. The graduates of Europe urged my father to waive his right to the chair for the sake of harmony, which he willingly did (though A. S. Copeman was his choice), at the same time receiving pledges to sustain him at the next election.

"One year passes round and another annual meeting is held in the city of New York. Again he is asked to waive his right in favor of A. S. Copeman, which he did under the second solemn pledge of support at the next annual meeting. In neither of these elections was there any opposition to the candidate named. The third annual meeting was held in the city of Boston; a call for nomination of officers was in order. The names of Robert Jennings, of New Jersey, and Charles M. Wood, of Massachusetts, were presented, New York and Massachusetts being fully represented, which was not the case with Pennsylvania and New Jersey. Again my father is urged to yield his right to the chair for the last time upon pledges already twice broken. His friends for the first time objected, and Wood and Jennings were the candidates. The ballot was decided a tie vote, the president, A. S. Copeman, was called upon to give the casting vote, which is rutable in all such assemblages. He said he had already voted and for Wood; this acknowledgment gave the election to my father by one majority. Quick upon the floor, a Boston member moves for another ballot, seconded by half a dozen. Pennsylvania and New Jersey members protested, but no new ballot was taken,

and C. M. Wood, who had twice pledged himself to support my father, was counted in by one majority.

"These facts I can prove by members who were present. If these facts are disputed, I challenge the production of the minute-book.

"These facts, I think, are sufficient to account for the absence of the originator of the U. S. V. M. A., as well as his friends."

PROSPERO.

MAY GOD PROTECT ME FROM MY FRIENDS!

BY A. LIAUTARD*

Had the poor, good old trotter the power of speech, he no doubt would have exclaimed these words when, on Sunday morning, Aug. 1, he landed in Brooklyn on his way to New Jersey, where he was to be turned out for the remainder of his life, as long as he is condemned to suffer until then, rather than to receive pity on his sufferings and to have an end put to a continued series of pains and tortures through mistaken affection.

On the last days of July his owner was informed by the veterinarian who had charge of Prospero, when and since he was condemned by us, that the *horse was in condition to be removed, that he was doing well, that all that could be done had been done, and THAT NATURE WOULD DO THE REST*,—fearful sarcastic notice, if it was not given in good faith.

Prospero left Camden and arrived in Brooklyn on Sunday morning.

Mr. Parks had the kindness to notify us of his arrival, and tendered an invitation to see him.

At first we hesitated, for our conviction of the correctness of our verdict of June last was too firm, and we knew that what we had said then would unfortunately prove true sooner or later. However, on second consideration, we decided to go to see how

*Reprinted from the *Turf, Field and Farm*.

much the disease had progressed, and what changes had taken place in those few weeks.

• On Sunday morning, Aug. 1, in company with Dr. Coates, we visited Brooklyn and found Prospero in a large box-stall, as comfortable as possible. He presented the following symptoms:

He looks quite bright, and, though he has lost much flesh since our last visit, his coat looks good; the pulse is rather weak, about 40, the temperature 102 3-5. The face presents, on the right side, the same appearance as it had at first, though the healing of one of the trephined holes makes it look less repulsive. The swelling is larger and more diffused; it extends lower on the maxillary, and higher toward the lacrymal. Through the opening left there is a thin and odorless discharge. The swelling is as soft as it was at first. There is a discharge through both nostrils, purulent, sanious, with odor of necrosis. The animal, when quiet, has labored breathing; he roars some, the roaring being increased as soon as he is excited. The septum nasi is diseased. The maxillary glands are much swollen and painful.

On examination of the alveolar cavities of the four teeth which have been removed, they are found filled with granulations, and a fistulous tract is detected in the posterior part. The finger introduced in it returns loaded with the peculiar odor of necrosed bone.

On visiting him the second following day with Mr. Very, of Boston, we found him in about the same condition, with the exception that his temperature had risen to 103, and we understood he had lost some blood from the mouth.

And this is the horse which is discharged, requiring nothing more but nature to cure him, which, as it was printed, would fulfil his trotting engagements, and about which the press of New York, Philadelphia and Boston has written so many erroneous statements, thus lending the assistance of their powerful influence to quackery, ignorance and charlatanism.

We have the promise of Mr. Parks to make the post mortem.
New York, Aug. 3, 1880.

CORRESPONDENCE.

NEW YORK, August 21, 1880.

Editor Am. Vet. Review :

DEAR SIR:—Availing myself of an invitation to see a friend's horse trot, in company with him, I arrived at the Prospect Park trotting course, where, on enquiring for Supt. Jarvis, was informed that he was out in the lot with a veterinary surgeon, destroying a horse who had lacerated his gullet, as they put it. In order to obtain permission to drive over the course we started for the lot, and arrived just in time to hear the veterinary surgeon explain to the gaping crowd of horsemen who surrounded him (and who knew all about a horse) the mysteries of the cardiac apparatus. Having divided the right ventricle, he exposed the tricuspid valves, explained to the crowd that they were the semi-lunar valves; he then went into rhapsodies over the beautiful way the cardiac nerves showed themselves. At the same time, picking up the chordæ tendinosæ, showing them to those around, he expressed a fear about never seeing such a sight again, and said he would take the heart away with him and have a drawing made from it; ignorant, no doubt, of the fact that in any illustrated work on anatomy he would find a drawing far superior to anything that could be produced from his specimen in the condition he had put it. He then indulged in a mild tirade on the uselessness of studying such subjects in books.

This new expounder of veterinary anatomy we were informed is a practitioner of the city of churches, enjoying a large practice, and is, I believe, a regular graduate of medicine by one of the newly-born diploma machines, called County Veterinary Medical Societies.

I know that this is but one of the many ignorant quacks who are found throughout the country, and I know also that it is best to leave them alone; but at the same time cannot help thinking of what harm the profession has received from the legally chartered machinery of these mills and the shame which must forever

remain attached to the names of those who have signed their diplomas.

Respectfully, &c.,

JOHN DOUGHERTY,

Student, Am. Vet. College.

NOTES AND NEWS.

MEETING OF THE UNITED STATES VETERINARY ASSOCIATION.

The next regular annual meeting of the United States Veterinary Medical Association will be held in the lecture-room of the American Veterinary College, 141 W. 54th Street, New York City, on Tuesday, September 21st, 1880, at 10 o'clock, A. M.

All members and friends are invited to attend.

By order,

A. A. HOLCOMBE, Secretary,

Inspector Vet. Surgeon, U. S. A.

ARMY INTELLIGENCE.

Doctor A. A. Holcombe has received the appointment of Veterinary Inspector in the army and is attached at present to the Department of the Missouri, located at Fort Leavenworth, Kansas.

VETERINARY HONORS.

We are pleased to announce the successful result of the examination of Dr. C. P. Lyman for the degree of Fellowship of the Royal College of Veterinary Surgeons.

REVIEW.

MANUEL DE MEDECINE OPERATOIRE VETERINAIRE.

BY A. DEGIVE.*

We have received the little book of Mr. A. Degive. In compiling in such a short space, 277 pages, the description of the operations performed upon horses, bovine, ovine, &c., in fact, all the domestic animals, Mr. Degive has certainly performed a work which deserves credit, as it must have required on his part careful selection of what could be left out and what was essential to the arrangement of his book. Of course it is very concise, and each subject is treated as briefly as it can be done; with all that, though it cannot be compared to the most perfect and complete work of Peuch and Toussaint, the manual will no doubt prove for young beginners an excellent assistant in the various manipulations of our special surgery. It is divided into two parts. The first, being subdivided into ten chapters, is essentially applied to the horse; while in the second part, five chapters treat of the surgery of the lower domestic animals.

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Boston Journal
Sept. 21st 1880

BOSTON AND VICINITY.

THE HORSE DISTEMPER.

Varying Reports of its Progress—The Fire Department Affected.

Fortunate is it for suffering horse flesh that we can enjoy the brightest and balmiest of autumn weather. The progress of the equine epidemic is likely to receive an effectual check; and a few more such days, it is hoped, will completely eradicate it from Boston stables. The reports from various quarters this morning are in some instances favorable, and in others not so hopeful. The most alarming fact is that the horses of the Fire Department are in some instances suffering seriously, and there is scarcely an animal that is free from the distemper. A few animals are entirely unfit for work, their strength being almost gone, so that they are scarcely able to keep their feet. There are sick horses at Horse Three, Engine Sixteen, and in two or three other houses, where outside animals have been substituted for those really disabled. Chief Engineer Green's horse is not in proper condition for work, but the Chief says he shall drive him as long as he can stand in case of fire. The horses all through the department will be driven as long as life remains in them if occasion demands. The disease has attacked the strength of the animals to an alarming degree. They suffer from a high fever and are liable at any moment when in the shafts to fall from sheer exhaustion. The places of all in the department would be immediately supplied from outside horses if it was thought that those now used were in any worse condition than the race generally, but it is argued that it would be just as cheap to kill the city's horses as those owned by private parties. Arrangements have been made so that any number of animals can be obtained at a moment's notice from livery stables if necessary. The response of the department to alarms cannot be quite so prompt as if there were healthy horses attached to the apparatus, and citizens generally should take unusual precautions against fire, and in case an incipient blaze is discovered every means should be used to get it under control with the means at hand. While there is no immediate danger of the scenes of 1872 being repeated, too great caution cannot be employed.

In the Metropolitan Railroad stables a marked improvement in the condition of the suffering animals is noticed this morning, and the genuine alarm felt yesterday is fast subsiding. Nearly all the cars are running to-day, and while most of the pumps on the street are visibly victims of the disease, it is thought the bright bracing weather has removed all danger of fatalities. The disease in the Highland stables shows no abatement, and some of their horses attached to the cars this morning showed distressing symptoms of the malady. The distemper did not appear in the stables of this road until very recently, and the crisis does not appear to have passed. Careful treatment is being exercised, however, and there has not yet been any interference in the running of the road. In the stables of the other roads the condition of the horses is about the same as on Monday. The deaths reported generally were due to a complication of this and other diseases.

Among the average team horses upon the street to-day the presence of the epidemic is more manifest than on Monday. Many of the drivers of these unfortunate beasts would gladly give them a chance to rest, did not the active demands of business keep them at work.

of 1862. A gentleman from Hingham reports that a number of horses in that neighborhood are sick with the same disease, but he has heard of no fatal cases.

VETERINARY REVIEW,

SEPTEMBER, 1880.

ARTICLES.

ANALYSIS

JUSTICE AND CARBUNCLE- TERMINATION OF THEIR AND OF THEIR VIRULENCY.

IN, of Alfort.

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THE HORSE DISTEMPER.

Prevalence in Boston—How the Horse-
car Corporations and Stable-Keepers Are
Affected—No Serious Results Apprehended.

About ten days ago stable-keepers were somewhat startled by observing among their horses symptoms of a distemper resembling the epidemic of 1872. As the malady appeared at first in a very mild form little attention was paid to it, but a few days it became more severe and widespread, until today there are but few horses in the city free from the disease. Profiting by the experience of eight years ago, when so many horses were for days unfitted for labor, the street railway corporations and stable-keepers have taken unusual precautions to prevent the disease from assuming serious proportions, and by the timely administration of medicine to those slightly attacked, and the withdrawal from labor all that refused to eat, no fatal cases are yet reported, and but a small percentage of the horses affected are unable to perform a full day's work. A careful inspection last night of the stables of the Middlesex Horse Railroad Company at Charlestown Neck, in which three hundred and seventy-five horses were housed, revealed but one horse coughing, and only a half-dozen which it was not considered judicious to work. The sickest one of these was rapidly recovering, and the general health of all the horses in the stable was much better than on the night previous. Superintendent Studley, who watched critically the epizootic and spinal diseases, when they were so prevalent a few years ago, fails to discover in the distemper now prevailing some of the symptoms that characterized those diseases. There appears to be no trouble with the eyes as there was then, and there is not so much general prostration. The greatest trouble is with the bowels, and the remedy used is aconite, which warms up the horse and starts healthy perspiration. Molasses and ginger would have the same effect, but it is difficult to administer in quantities sufficient to produce the desired effect. Mr. Studley thinks that a few days of clear, cold weather would restore the horses to perfect health. Of the five hundred horses used by this road, but nine have been withdrawn from work, and a portion of these were only housed as a precautionary measure. The Metropolitan Company have a large number of horses affected, but none seriously. Of the three thousand horses in the stables of the road, about sixty are unfit for work, but little apprehension is felt that they will not recover. Nearly all of the seven hundred horses of the Highland road are affected, but none seriously, and the same may be said of those of the Union, South Boston and Lynn & Boston. None of these roads have been obliged to make any but the most trifling changes in the running time or number of trips of their cars, and all have cautioned their drivers to exercise the greatest care not to overwork the horses. It has been found advantageous to keep the mildly affected animals at work, provided they retain their appetites. Of the two hundred and fifty horses in the stables of J. P. Barnard only one is seriously affected. All are more or less sick, but are at work, as it is found better to keep them in the open air than shut up in the stables. Other stables were visited, and with the same result, the general opinion being that little fear need be apprehended of a repetition of the serious epidemic of 1872. A gentleman from Hingham reports that number of horses in that neighborhood are sick with the same disease, but he has heard of no fatal cases.

VETERINARY REVIEW, BER, 1880.

L ARTICLES.

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